

Remarks

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Initially, a spelling error has been corrected in the last word of original claim 1, from "state" to --site--, consistent with the use of this latter term in claim 3. Furthermore, the subject matter of claim 2 has been incorporated into amended claim 1, as a result of which claim 2 has been cancelled.

Claim 4 has been cancelled since it is dependent on claim 2, and claim 6 has been cancelled since it is dependent on claim 4.

The patentability of the presently claimed invention after entry of the foregoing amendments, whether the disclosures of the references relied upon by the Examiner in rejecting the claims, will be apparent upon consideration of the following remarks.

Thus, the rejection of claims 1-6 under 35 U.S.C. § 103(a) as being unpatentable over JP 2001-31629 in view of Tomishige et al. is respectfully traversed.

The catalyst of the present invention is obtained by loading a Broensted acid radical on a carrier composed of a compound having a solid site (claim 1), such as ZrO₂, Al₂O₃ or TiO₂ (claim 3).

The Examiner states that the difference between JP '629 and the instant process is that tin oxide is used as a catalyst in the JP '629 reference as opposed to a zirconium compound as in the present invention.

However, considering amended claim 1, another distinction between the present invention and JP '629 is that the present invention uses a Broensted acid, whereas JP '629 uses a Lewis acid.

In this regard, claim 3 and paragraph [0018] of JP '629 disclose that Lewis acids promote the reaction of CO₂ with acetal compounds. The Lewis acids disclosed in JP '629 include organometallic oxides such as dibutyl tin oxide. These organometallic oxides have a combustible, degradable nature, and may also produce toxic metallurgical fumes, making them disadvantageous in terms of handlability.

In contrast, the catalyst of the present invention is less toxic by the use of SO₄²⁻ or PO₄³⁻ and advantageous in terms of handlability. Additionally, the claimed catalyst has improved reaction efficiency due to highly dispersed phosphate radicals or sulfate radicals on a metallic

oxide, particularly one having high specific surface area (see claim 5).

Tomishige et al. lack a disclosure that SO_4^{2-} or PO_4^{3-} can exist on the surface of zirconia. This reference only discloses that the surface of "bare" zirconia particles has an *amphoteric* nature, i.e. both acidic and basic nature, as is evident in the reaction steps [7]-[12] on page 362, left column. The arrangement of the acidic CO_2 at a *basic* site, and the basic methanol at a *neighboring acidic* site develops reactivity in the catalyst of Tomishige et al.

In contrast, in the claimed catalyst, SO_4^{2-} or PO_4^{3-} supported by, for example, on zirconia particles improves reaction efficiency.

For these reasons, Applicants take the position that the presently claimed invention is clearly patentable over the applied references.

Therefore, in view of the foregoing amendments and remarks, it is submitted that the ground of rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

The Commissioner is authorized to charge any deficiency or to credit any overpayment associated with this communication to Deposit Account No. 23-0975, with the EXCEPTION of deficiencies in fees for multiple dependent claims in new applications.

Respectfully submitted,

Hiroyuki OSORA et al.

For: Michael R. Davis, A.B.F.
Michael R. Davis
Registration No. 25,134
Attorney for Applicants

By: Andrew B. Freistein
Andrew B. Freistein
Registration No. 52,917
Attorney for Applicants

MRD/rgf
Washington, D.C. 20005-1503
Telephone (202) 721-8200
Facsimile (202) 721-8250
July 6, 2009